



STEMsational Ag: The Virtual Farm

MIDDLE TENNESSEE STATE UNIVERSITY



Module 1: Cereal - Thinking Outside the Box UNIT 2: COOKING WITH WHOLE GRAINS Grades 3 - 5



National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE



This work is supported by the Agriculture and Food Research Initiative, Education and Workforce Development Program. [grant no. 2021-67037-33380/project accession no. 1024880], from the U.S. Department of Agriculture, National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and should not be construed to represent any official USDA or U.S. Government determination or policy.

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STEMsational Ag—The Virtual Farm

Welcome to Module 1 Unit 2: Cooking with Whole Grains



Introduction:

In this unit, learn how to identify whole versus refined grains, as well as several fun ways to prepare them.

Pre-assessment:

Take out a piece of paper and write your answers to the following questions or type them in a word document on your computer.

- What is a whole grain?
- What are some examples of whole grain foods?
- Where do whole grains come from?
- In what ways do whole grains help our health?

Set your answer aside, you will refer back to them later in the lesson.

Purpose:

To help learners understand what refined versus whole grain means and how the differences affect health.



Student Learning Outcomes for the Unit:

- Students will learn why nutrients can be lost when a food is refined.
- Students will sing a song to learn from where whole grains come and health benefits.
- Students will build a whole grain model and remove parts to make it refined.
- Students will conduct a survey to see data of the variety of whole grains they can eat.
- Students will select and cook a cold oats breakfast recipe and store it safely.

National Agricultural Literacy Outcomes

Food, Health & Lifestyle, Theme 3

T3.3-5

- A. Describe the necessary food components of a healthy diet using the current dietary guidelines.
- B. Diagram the path of production for a processed product, from farm to table.
- C. Distinguish between processed and unprocessed food.
- E. Explain the practices of safe food handling, preparation, and storage.
- G. Identify food sources of required food nutrients.

Vocabulary:

- **Refine:** the process of removing sections from a whole object like removing some of a grain, which lessens its health benefits
- **Nutrients:** vitamins, minerals, and other parts of a food that make it healthy to eat. Whole grains contain nutrients like fiber that help us fight disease
- **Whole Grain:** grain that has not been refined and still has its bran, endosperm, and germ present
- **Model:** a recreation of something else, made from various materials, to show and tell about it
- **Oats:** whole grain food, commonly used in baked goods and snacks, like muffins and granola bars, as well as meals, like oatmeal and meatloaf. It provides many nutrients and helps us protect our bodies from disease

Materials Needed:

- Play dough
- Crayons or markers
- Paper
- Optional: materials of choice (in three colors)



The Whole Grain Train Song

*A free song for kids everywhere from
The Oldways Whole Grains Council*



All Aboard The Whole Grain Train

Chorus:

Amaranth, barley, buckwheat, corn
If you like to pop it blow your horn.
Millet, oats, quinoa, rice,
Sorghum can be really nice.
Feed your body, fuel your brain,
Hop on the Whole Grain Train.

Verse 1:

Brown rice is quite complete
Half a grain just can't compete
Breakfast, lunch, dinner, snack –
Whole grains put your health on track.

Chorus

Verse 2:

What can you make with whole wheat?
Pizza dough is really neat.
Whole wheat noodles, whole wheat bread...
Don't put whole grains on your head!

Bridge:

Land, sun, seeds and showers
Help us make whole grain flours.
Make my sandwich on whole wheat!
Whole kids need whole treats!

Chorus

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www.WholeGrainsCouncil.org * www.cathymarcy.com



All Aboard...The Whole Grain Train!

The Whole Grain Train

Cathy Fink & Marcy Marxer



Singer

Chorus

D

1 2 3 **A**

mf
Am- a- ranth, bar- ley, buck- wheat,

5 **E7** 6
corn. If you like to pop it

A 8 **D** 9
blow your horn. Mil- let,

10 **A** 11 12
oats, quin- oa, rice

13 **E7** 14 15 **A**
sor- ghum can be real- ly

16 **D** 17 18
nice. Feed your bod- y

19 **E7** 20 21 **A**
fuel your brain. Hop

22 **E7** 23 24 **A**
on the Whole Grain Train.

Verse

E7 25 26 27 **A**
Brown rice is quite com-

28 **E7** 29 30
plete Half a grain just



can't com- pete Break- fast,
lunch, din- ner, snack
Whole grains put your health on
track. Land, sun,
seeds and show- ers Help us
make whole grain flou- rs
Make my sand- wich on whole
wheat! Who- le kids
need whole treats!
58



Read through the lyrics and learn about whole grains! If you have access to a piano and someone can play the song, sing along with the music.

What did you learn from the song?

Take out a piece of paper and write your answers to the following questions or type them in a word document on your computer.

1. What is a whole grain? What are some examples?
2. Where do they come from?
3. In what ways can they help our health?

Use the Whole Grains Song Answer Key on page 22 to check your answers when you're done!



Conduct the "How A-Peeling?" Survey

- Collect data about food preferences using the How A-Peeling Survey Tool.
- Follow the directions on page 9.
- After collecting the survey data, identify the most and least popular results.
- Then answer and discuss the following questions with a friend, family member, or classmates:
 1. Which option (i.e., peeled or unpeeled, white or brown or whole wheat) had the most votes for each food item?
 2. What do you think is the healthier option for each food item? Explain.
 3. If you don't like peels or whole grain versions of foods, how can you compromise?



How A-Peeling Survey

Instructions:

Survey 1 to 5 people, including yourself. Ask each participant to vote on how they prefer each of the four foods: apple, cucumber, rice, and bread. For apple and cucumber, write a “P” in the column if they prefer to eat it peeled, and a “U” in the column if they prefer to eat it unpeeled. For rice and bread, write a “W” in the column if they prefer to eat white rice or white bread. Write a “B” in the column if they prefer to eat brown rice. Write “WW” if they prefer to eat whole wheat bread.

Use page 2 of this document to record the results of the survey. Make note of the most popular and least popular foods.

Survey Participants (add their name in the box)	Apple Peeled = P Unpeeled = U	Cucumber Peeled = P Unpeeled = U	Rice White = W Brown = B	Bread White = W Whole Wheat = WW
Person 1:				
Person 2:				
Person 3:				
Person 4:				
Person 5:				

Results:

- | | | | |
|---------|------------|--------|---------|
| • Apple | • Cucumber | • Rice | • Bread |
| ○ P= | ○ P= | ○ W= | ○ W= |
| ○ U= | ○ U= | ○ B= | ○ WW= |



Learn More about the Nutritional Content of the Foods in the Survey

When we peel most fruits and vegetables, we eliminate some of the vitamins and minerals that make them good for us. An apple's peel contains fiber, vitamin C, vitamin A, and many powerful plant nutrients. A cucumber's skin has plenty of fiber and plant nutrients too, as well as vitamin K and potassium.

The unpeeled and whole grain versions (brown and whole wheat) are the healthier food options. The grains in rice and bread aren't peeled like fruits and vegetables, but they can be refined. Refined means removing parts of the grain, much like when we peel the skins of fruits and vegetables. The parts of the grain removed often contain very helpful nutrients too, like fiber, vitamins, and minerals. Brown rice and whole wheat bread are whole grains. White rice and white bread are refined grains.

So, what should you do if you don't like to eat the peel on fruits and vegetables or whole grain versions of foods? Just remember, even some is better than none! You can start by peeling off only part of the skins or by preparing half white and half brown rice. You can even try a bread that is made using half white and half whole wheat flours.

Build a Better Grain Activity

Part 1: Whole Versus Refined Grains

What do we mean when we say "whole" versus "refined" when we are talking about grains? If you have a computer, visit this Whole Grains Council website <https://wholegrainscouncil.org/what-whole-grain> to learn about the three parts that make a grain whole.

Continue reading the importance how each grain is helpful to our health on page 11.



Home

WHAT IS A WHOLE GRAIN?

All grains start life as whole grains. In their natural state growing in the fields, whole grains are the entire seed of a plant. This seed (which industry calls a "kernel") is made up of three key edible parts – the bran, the germ, and the endosperm – protected by an inedible husk that protects the kernel from assaults by sunlight, pests, water, and disease.

THE BRAN

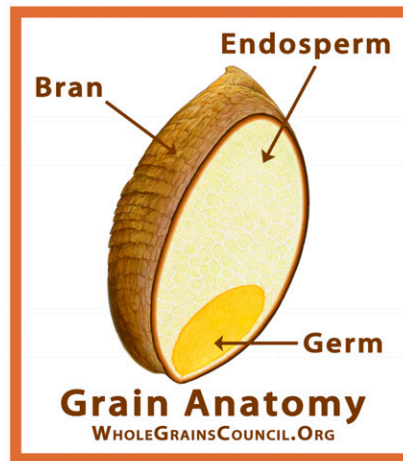
The bran is the multi-layered outer skin of the edible kernel. It contains important antioxidants, B vitamins and fiber.

THE GERM

The germ is the embryo which has the potential to sprout into a new plant. It contains many B vitamins, some protein, minerals, and healthy fats.

THE ENDOSPERM

The endosperm is the germ's food supply, which provides essential energy to the young plant so it can send roots down for water and nutrients, and send sprouts up for sunlight's photosynthesizing power. The endosperm is by far the largest portion of the kernel. It contains starchy carbohydrates, proteins and small amounts of vitamins and minerals.



WHOLE GRAINS ARE HEALTHIER

Whole grains contain all three parts of the kernel. Refining normally removes the bran and the germ, leaving only the endosperm. **Without the bran and germ, about 25% of a grain's protein is lost, and are greatly reduced in at least seventeen key nutrients.** Processors add back some vitamins and minerals to enrich refined grains, so refined products still contribute valuable nutrients. But **whole grains are healthier**, providing more protein, more fiber and many important vitamins and minerals.

[Click here to see a graphic](#) that shows what's lost when wheat is refined, and the little bits that are added back – only a few components, and not in their original proportions – when grains are enriched. [Here's another graphic for rice](#), that shows similar differences between whole grain (brown) rice and white (refined) rice.

Whole grains may be eaten whole, cracked, split or ground. They can be milled into flour or used to make breads, cereals and other processed foods. If a food label states that the package contains whole grain, the "whole grain" part of the food inside the package is required to have the same proportions of bran, germ, and endosperm as the harvested kernel does before it is processed.

FINDING WHOLE GRAINS

Whole grains currently make up far less than half of all grains on supermarket shelves (though growing every day!). At a time when health professionals urge consumers to eat at least half of their grains as whole grains, our [Whole Grain Product Finder](#) can make finding whole grains a snap.



Part 2: Make a Whole Grain

- Now, make your own version of a whole grain using any materials you desire.
 - For example, you can use three different colors of play dough to build it, or you can use crumbled up construction paper in different colors and plastic wrap.
 - Or draw and color a picture using different crayons or markers. You decide!
- Show a family member, friend, classmate, or teacher your model and tell them the name each of part of your model.
- Remove or cover the two parts that typically result in a refined grain. Explain to them what is now missing.

Cook a "Cooler" Oatmeal

Oats are a wonderful way to start your day because they give you plenty of energy to think and play hard, and they keep you feeling full until lunch. Some children like to eat hot oatmeal for breakfast. Did you know that oatmeal can be eaten cold too? Just like hot oatmeal, you can also change up the toppings and mix-ins for cold oats. In this activity, you will see many recipes that you can use to make cold oats.

One very important note: you must store cold oats in the refrigerator since they contain dairy, like milk and yogurt. If not kept cold at the correct temperature, it will spoil and make you sick.

Make Overnight Oats! (*Adult supervision required*)

- Read the article on pages 13-16, ***How to Make Basic Overnight Oats***, from the Super Healthy Kids website, to learn more about making cold oats.
- Then, follow the directions and choose the ingredients you want to use from the section of the article titled, "***How to Make Overnight Oats***."



How to Make Basic Overnight Oats

<https://www.superhealthykids.com/basic-overnight-oats-recipe/>

How to Make Basic Overnight Oats

By Amy Roskelley

Published on October 3, 2018

Overnight oats are a breakfast game changer!

Simple, filling, and delicious oatmeal is high in fiber and whole grains. And whipping them up before bed makes weekday mornings a breeze.





This post was originally written almost 10 years ago, and I had titled it “Swiss Meusli.” This was BEFORE overnight oats started trending online as a breakfast idea. Originally developed in the early 1900’s as a healing food for patients in a Swiss hospital, Muesli is now eaten in Switzerland as an evening dish.

While I originally grew up calling this breakfast Muesli, overnight oats makes a great breakfast food for those who love the filling nature of a grain based breakfast. It’s made by soaking oats or other grains and keeping it in the fridge for several hours or overnight so the liquid absorbs into the grains. If you can remember to prepare this the night before, it makes a quick, easy, and healthy breakfast for busy mornings- without the mess!

What Are Overnight Oats?

Overnight oats is a way to prepare oatmeal for breakfast that changes the texture and flavor of regular cooked oatmeal. Simply combine uncooked oats with a liquid, and any other add-ins you desire, and leave in the refrigerator overnight to allow the liquid to absorb into the oats. In the morning, these oats do not need to be cooked. Just stirred and eaten! This has become increasingly popular in the last few years. Soaked oats are easily digestible, and more appealing for kids who don’t like the texture of cooked oats.

Are Overnight Oats Raw?

Even though YOU don’t cook overnight oats, they’re not a raw food. That’s because old-fashioned oats are steamed and rolled flat (that’s why they’re sometimes called “rolled oats”) before they’re dried and packaged for sale.

This is a good thing: the cooking process helps make oats easily digestible.

How to Make Overnight Oats

Here’s a simple formula for making great overnight oats every time:

- 1 cup oats

You can use any type of oats. Rolled oats, steel cut oats, oat groats, or quick oats.



- 1 to 1 1/2 cups liquid
 - Any liquid can be added. Popular liquids include milk, almond milk, coconut milk, yogurt, or even juice.
- 1 teaspoon sweetener
 - I like honey, but you could also use maple syrup, agave, organic brown sugar, date sugars, or nothing at all!
- Fruit
 - Fresh fruit like apple slices, grapes, melons, berries, bananas, etc. are delicious in overnight oats.
 - You can add dry raisins, apricots, bananas, dates.
- Optional: Nuts or seeds
 - We usually add chopped pecans. But walnuts and almonds are also fabulous!

Put oats, liquid, and sweetener combined in fridge overnight.
Add nuts and fruit in the morning.

Are You Supposed to Eat Overnight Oats Cold?

Yes!! This question comes up a lot because we are so conditioned to think of oats as only a hot cereal option. But eating them cold after they are soaked is why overnight oats are different enough for kids to try it who aren't fans of hot oatmeal. However, you can also heat up overnight oats and eat them warm as well.

Storing Overnight Oats

Many people choose to store overnight oats in glass jars. This is a great way to keep them. Mason jars are inexpensive, portable, and you can stack them on your refrigerator door and it won't take up much space. That said, any lidded container will do. Keeping it air tight helps keep the oats soft and moist, and prevents them from drying out, which will happen very quickly if you don't keep it covered.





- If you want (optional) you can use one of the recipes provided for added flavor:
 - Apple Pie Overnight Oats
 - Banana Bread Overnight Oats
 - Strawberry Overnight Oats
- Ask an adult to help you with obtaining the needed ingredients, any chopping and pouring, and proper storage.
- Prepare it today to enjoy it tomorrow morning!

Apple Pie Overnight Oats

Banana Bread Overnight Oats

Strawberry Overnight Oats

Recipes





Apple Pie Overnight Oats with Quinoa

This healthy breakfast recipe is prepared the night before, so you don't have to worry about whipping anything up in the morning. It's simple, packed with nutrients and tastes like apple pie!

Prep Time	Cook Time	Total Time
15 mins	10 hrs	10 hrs 15 mins



2.9 from 10 votes

Course: Breakfast Cuisine: American

Keyword: Apple Pie Overnight Oats with Quinoa Servings: 4

Calories: 293kcal

Ingredients

- 1/2 cup oats, dry
- 1/2 cup quinoa flakes
- 2 tablespoon chia seeds
- 2 teaspoon cinnamon
- 1 1/4 cup almond milk, unsweetened
- 1/2 cup applesauce, unsweetened
- 2 tablespoon maple syrup, pure

Filling

- 2 medium apple
- 2 teaspoon cinnamon
- 2 tablespoon maple syrup, pure
- 2 tablespoon water
- 1 tablespoon chia seeds

Instructions

1. Add oats, quinoa flakes, chia seeds, and cinnamon to a large bowl. Stir to combine.
2. Whisk together milk and applesauce (maple syrup optional here!). Stir into oat mixture and cover with plastic wrap. Refrigerate mixture overnight.
3. For the apple pie filling: peel and dice apples. Add apples to a small saucepan along with the cinnamon, syrup, and water; bring to a boil.
4. Reduce to a simmer and cook until mixture begins to thicken, about 5 minutes. Remove from heat and stir in chia seeds. Allow the mixture to cool for 5-10 minutes before assembling the oats.
5. Layer oats and filling into cups for a parfait, or simply spoon the oats into bowls and top with filling. Enjoy!

Nutrition

Calories: 293kcal | Carbohydrates: 57g | Protein: 7g | Fat: 6g | Saturated Fat: 1g | Sodium: 65mg | Fiber: 10g | Sugar: 25g



Banana Bread Overnight Oats

Banana bread inspired overnight oats are quick to whip up for a great breakfast or snack on-the-go!

Prep Time
10 mins

Total Time
10 mins



Course: Breakfast Cuisine: American

Keyword: Banana Bread Overnight Oats Calories: 461kcal



4.16 from 25 votes

Ingredients

- 1 1/2 medium banana
- 2/3 cup oats, dry
- 1/2 cup Greek yogurt, plain
- 1 1/2 tablespoon chia seeds
- 2/3 cup milk
- 1/2 teaspoon cinnamon
- 2 tablespoon pecans, chopped

Instructions

1. Mash 1 banana with a fork in a large bowl. Add the oats, yogurt, chia seeds, milk, and cinnamon. Stir well.
2. Pour mixture into two half-pint (1-cup) canning jars. Cover and refrigerate overnight.
3. Cut half of a banana into slices and top each jar with some of the banana slices and 1 tablespoon of chopped pecans. Enjoy!

Nutrition

Serving: 1g | Calories: 461kcal | Carbohydrates: 66g | Protein: 21g | Fat: 15g | Saturated Fat: 4g | Cholesterol: 14mg | Sodium: 59mg | Fiber: 12g | Sugar: 18g



Strawberry Overnight Oats

Prep Time
10 mins

Cook Time
5 mins



★★★★☆
4 from 5 votes

Course: Breakfast Cuisine: American
Keyword: Strawberry Overnight Oats Servings: 4
Calories: 214kcal

Ingredients

- 3 1/2 cup water
- 1 cup steel cut oats
- 1 small vanilla bean
- 1 dash salt
- 4 cup strawberries
- 1/4 cup milk
- 1 teaspoon chia seeds

Instructions

1. Before you go to bed, put 3 1/2 cups filtered water in a large sauce pan and bring to a boil.
2. Prepare the vanilla bean by slitting the bean open along its length with the tip of a small knife. Pry the bean open to expose the seeds.
3. Once the water has come to a boil, stir in the oats and the vanilla bean and boil for 1 minute. Turn off the heat, cover, and go to bed.
4. In the morning, reheat the oats in the pan.
5. Hull and slice half the strawberries and puree the other half in a blender or food processor until smooth.
6. Layer the hot oatmeal with the strawberries and strawberry puree. Serve hot with a little milk, cream, coconut milk, or almond milk. Sprinkle on chia seeds or other garnish as you like.
7. Serves 2-4 depending on how hungry you are :)

Nutrition

Calories: 214kcal | Carbohydrates: 39g | Protein: 8g | Fat: 4g | Cholesterol: 2mg | Sodium: 90mg | Fiber: 8g | Sugar: 8g



Post-Assessment

Take out a piece of paper and write your answers to the following questions or type them in a word document on your computer.

1. What are some examples of whole grain foods?
2. In what ways do whole grains help our health?

Look back at your Pre-Assessment answers. What did you learn?

Activity Option 2: Create a balanced meal!

- Write your own set of lyrics (1-5 sentences) to add something you learned about whole versus refined grains to the "Whole Grain Train" song.
- You may also add other details you discovered about grains from this lesson.
- Then, play the song and sing along with your new set of lyrics.
- With an adult's help, make a video of your performance to share with a friend.



Whole Grains Song Answer Key from page 8

1. Whole grains are crops that we eat. Examples include amaranth, barley, buckwheat, corn, millet, oats, quinoa, rice, sorghum, brown rice, and whole wheat.
2. They are grown on farms and need sun and water.
3. They power our brains, nourish our bodies, and keep us in good health.

Source: Whole Grain Train Song, Whole Grains Council website.

<https://wholegrainscouncil.org/resources/whole-grain-train-song>